PROPOSED PINE COULEE PROJECT

PROJECT DESCRIPTION

AND

PROPOSED TERMS OF REFERENCE

FOR THE

ENVIRONMENTAL IMPACT ASSESSMENT

Reservoir Development Division
Alberta Public Works, Supply and Services

June 1991

92-04049/

Alberta
PUBLIC WORKS, SUPPLY AND SERVICES
Reservoir Development Division

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June 17, 1991

Director
Environmental Assessment Division
Alberta Environment
6th Floor, Oxbridge Place
9820 - 106th Street
Edmonton, Alberta
T5K 2J6

Dear Sir:

RE: PROPOSED PINE COULEE PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
PROPOSED TERMS OF REFERENCE

Attached are proposed terms of reference for the Environmental Impact Assessment (EIA) of the proposed Pine Coulee Project.

The EIA is being undertaken by Reservoir Development Division, Alberta Public Works, Supply and Services. The proposed Pine Coulee Project was initially announced by the Minister of Environment on December 16, 1988. A copy of the news release is attached.

We ask your confirmation that the terms of reference are acceptable to your Division or alternatively, direction on appropriate changes to the terms of reference. We intend to provide these terms of reference for public review at an open house in Stavely on July 11, 1991. It should be noted that development of these terms of reference has had the benefit of significant public input solicited through public meetings and open houses over the past year and they have been reviewed and accepted by the Public Advisory Committee for the proposed Pine Coulee Project.

We look forward to receiving the results of the review of these terms of reference.

J. W. Thiessen, P. Eng.
Executive Director
Reservoir Development Division

Alberta NEWS RELEASE

ENVIRONMENT

Date: December 16, 1988

Subject: **GOVERNMENT ANNOUNCES $62 MILLION WATER MANAGEMENT PROJECTS FOR SOUTHERN ALBERTA**

Multi-use water storage reservoirs in the Little Bow and Willow Creek Basins will be constructed by the Alberta Government, Environment Minister Honourable Dr. Ian C. Reid announced today in Lethbridge.

The Willow Creek Basin Project, located 6 km. west of Stavely, will cost $35 million dollars over five years, and will provide an assured water supply for agriculture, municipal needs for Claresholm and Granum, and improved recreation opportunities.

The Little Bow Project will cost $27 million over four years. The project will preserve the Bow River fishery by protecting river flows in the Highwood River system, will improve the reliability of municipal water supplies for Vulcan, Champion, Cayley, Nanton and Carmangay, will create recreation potential at Clear Lake and the Little Bow River Reservoir, and will provide water for the agriculture industry. This project involves construction in three separate areas, including the Highwood River, in the town of High River; Clear Lake, 16 km. east of Stavely; and the Little Bow River, 16 km. east of Parkland.

Both projects should be concluded by 1995 with design and construction being managed by the Department of Public Works, Supply and Services under the Minister, Honourable Ernie Isley.

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Dr. Reid told a news conference today that these projects should not be viewed in isolation, "but as part of the ongoing management of water for the benefit of all southern Albertans."

"The recent years of drought have clearly demonstrated the need for careful water management and this has rarely been so obvious or so crucial in southern Alberta," the Minister said. "These projects will increase our ability to store spring water flows to help us better manage our water resources throughout each year far into the future."

Both projects have minimal environmental impacts which can be mitigated and have been the subject of environmental impact studies by the Department. They are supported by the Willow Creek Irrigators' Association, the Little Bow Water Users' Association and the Clear Lake Water Users' Group. To complete the process for both projects, Alberta Public Works, Supply and Services must submit a formal Environmental Impact Assessment to Alberta Environment.

"These projects will have demonstrable environmental and financial benefits to southern Albertans," said the Environment Minister. "The reservoirs are part of our water management strategy of effective use and conservation. They will mean reliable water supplies in the river basins for fish, will assist southern Albertans during times of drought, and the additional irrigated land will prevent dryland soil erosion," he said.

In addition to the construction costs of the reservoirs and diversion canals, there will be substantial investment undertaken by irrigators in order to apply water to the land.

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Equipment expenditures are expected to total $11 million for the Willow Creek Basin Project and $11.4 million for the Little Bow Project. In addition, expenditures related to expanded crop production will stimulate the local economy and net farm incomes are expected to increase by approximately $3.1 million per year for the Willow Creek Basin Project and $2.8 million per year for the Little Bow Project.

Recreation potential will increase through an expanded tree planting program, improved sport fishing, additional water sport activity, and development of day facilities. The Little Bow Project will begin next spring with construction of the Clear Lake segment to enhance recreation on the Lake. Reservoir construction will begin in 1990.

Project design is scheduled to begin next year on the Willow Creek Basin Project. Following the Environmental Impact Assessment land acquisition and environmental mitigation is expected to begin in 1990, with construction to commence in 1991.

Dr. Reid concluded by saying that these two projects will "bring substantial benefits to southern Alberta through the Government's continuing commitment to water management."

"With the new irrigation project on the Blood Reserve southwest of Lethbridge and the construction of the Oldman River Dam, our goal of ensuring that Alberta's most valuable resource is being used for the benefit of all Albertans is several steps nearer," he said.

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For more information contact:

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ALBERTA PUBLIC WORKS, SUPPLY AND SERVICES

PROPOSED PINE COULEE PROJECT

PROJECT DESCRIPTION

ALBERTA PUBLIC WORKS, SUPPLY AND SERVICES

PROPOSED PINE COULEE PROJECT
PROJECT DESCRIPTION

1.0 PROJECT OVERVIEW

The proposed project is an offstream storage reservoir to provide flow augmentation in Willow Creek by storing water during periods of high flow and releasing it during periods of low natural flow to meet instream and consumptive demands.

1.1 Proponent

The proponent for this project is Alberta Public Works, Supply and Services (APWSS). The Pine Coulee Project is being developed by the Reservoir Development Division (APWSS) and will be turned over to Alberta Environment (AE) upon completion and operated by Development and Operations Division (AE).

1.2 Project Area

The project area for the proposed Pine Coulee Project is shown on the attached map (Figure 1). The Pine Coulee Project area includes Willow Creek from approximately 0.5 mi. (800 m) upstream of the SR527 bridge over Willow Creek near Willow Creek Provincial Park (proposed point of diversion) to its confluence with the Oldman River and approximately 8 mi. (13 km) of Pine Coulee upstream from the confluence of Pine Creek and Willow Creek (Pine Coulee dam and reservoir).

1.3 Physical Setting

The study area is located on the western edge of the Interior Plains physiographic region, near the Porcupine Hills. Surface water, aided by low infiltration rates, runs eastward from these hills towards the Willow Creek and Pine Coulee area. Local relief is subdued, with the exception of the north-trending Pine and Willow Creek valleys, which are incised some 80 - 115 ft. (25 - 35 m) into the uplands above the valleys. Both the Pine and Willow Creeks belong to the Oldman Drainage Basin. The climate is classified as semi-arid to subhumid continental. The mean annual precipitation is 16.5 in. (419 mm) and the annual potential evapotranspiration is approximately 30 in. (762 mm) near Claresholm. Hence, the potential evapotranspiration is approximately 1.8 times the precipitation.

1.4 Development Plan

The development consists of a diversion structure on Willow Creek, a supply canal from Willow Creek to Pine Coulee and the Pine Coulee dam and reservoir.

2.0 PROJECT DESCRIPTION

2.1 History

The recent history of the proposed project commenced in the early 1980's with public concerns regarding water management in the Willow Creek Basin, and was followed by subsequent studies (1984-87) to identify and select water management options for the basin. Resultant government commitments regarding the project included the 1988 government announcement of the project and announcements in 1990 with respect to water management in the South Saskatchewan River basin.

2.2 Project Need

Historically Willow Creek has experienced low flows in the late summer and total freeze up in the winter. Occasional spring flooding has also occurred. In the winter of 1982 the creek totally froze and municipal water supplies for both Claresholm and Granum were curtailed causing serious water supply problems. The Town of Granum hauled water for almost 40 days. Summer flows ceased twice in 1984. Irrigation use was terminated in 1984, 1985, 1987, 1988 and 1989 causing serious crop losses. The proposed project could provide a secure municipal water supply for the towns of Claresholm and Granum, provide a secure water supply for an existing 8,000 acres (3240 ha) of irrigated agriculture, allow up to 21,000 acres (8500 ha) of irrigation expansion, and provide for improved flow conditions downstream of the reservoir to the betterment of recreation, fisheries, water quality and domestic and livestock water supplies. Recreation development and a sport fishery in the reservoir could also add to the economic base in the region.

2.3 Project Definition

The project is comprised of:

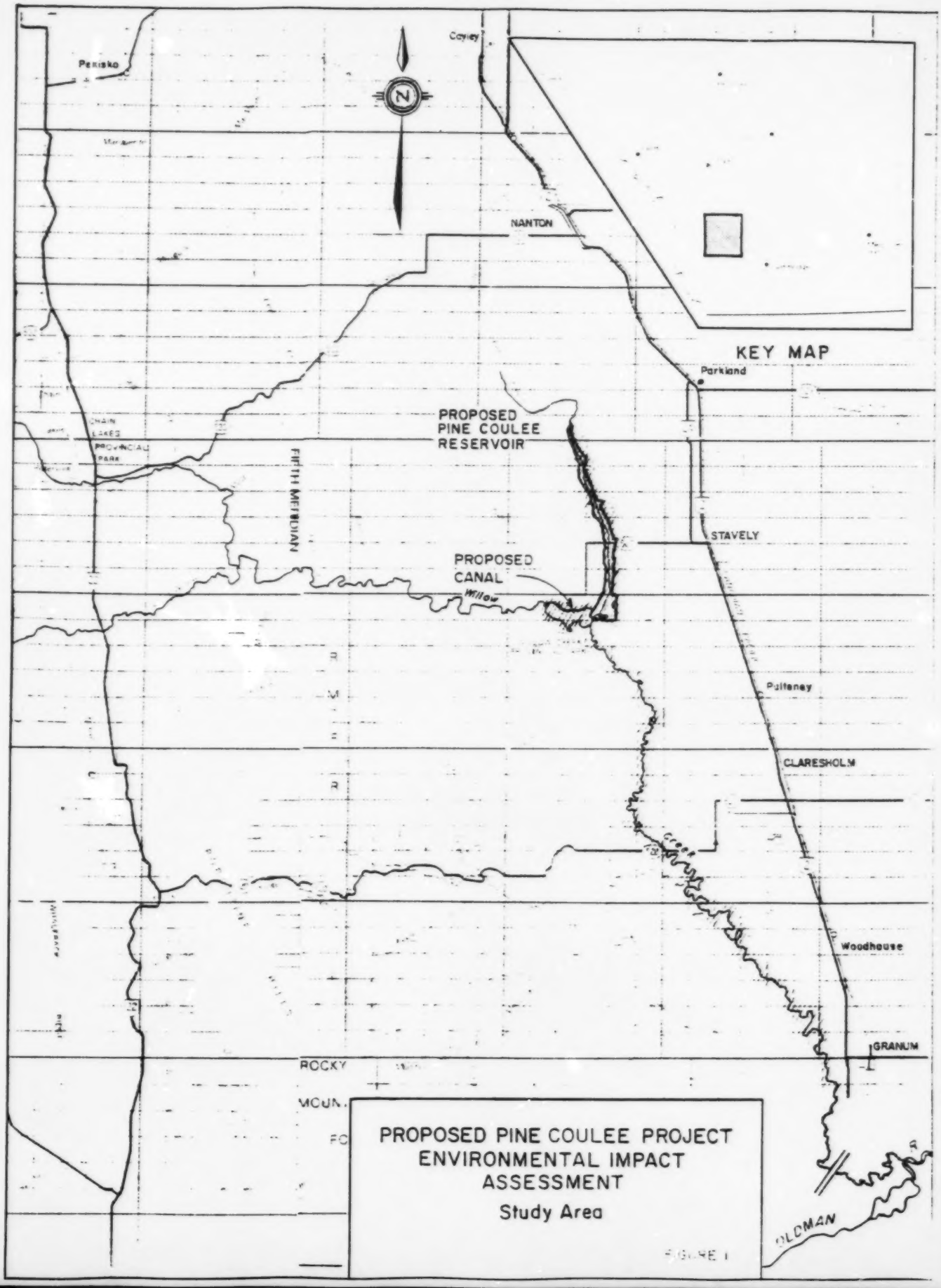
i) a diversion weir on Willow Creek
ii) a 300 cfs (8.5 cms), 2.2 mi (3.5 km) long canal from the diversion weir on Willow Creek to Pine Coulee
iii) a 71 ft (21 m) high earthfill dam creating a 41,000 ac. ft. (50,600 dam^3) storage reservoir in Pine Coulee with facilities to return stored water to Willow Creek

3.0 PUBLIC PARTICIPATION

APWSS and Alberta Environment have completed a number of public information initiatives since 1985 when the first local Public Advisory Committee for the Pine Coulee Project was established. Through an extensive public consultation process that has included public meetings, open houses, workshops and newsletters the public has been informed of, and been instrumental in the development of, this project. Through issue scoping interviews at open houses the public has contributed to the preparation of the terms of reference following for the Environmental Impact Assessment (EIA). Also the public contribution and concerns are being utilized and addressed in the preparation of the EIA. The current Public Advisory Committee has reviewed and accepted these proposed terms of reference.

APWSS established a public information office for the proposed project in Stavely, Alberta in the spring of 1990. The office is open every Thursday from 9:00 a.m. to 4:00 p.m. A telephone message recording service is in full time operation and is checked regularly. Callers are also encouraged to contact the project's public liaison officer in Lethbridge if they so desire.

APWSS intends to circulate a draft EIA report and hold open houses to discuss this report with the public prior to submission to Alberta Environment for regulatory approval.


Coyley
Pekisko
NANTON
KEY MAP
Parkland
PROPOSED
PINE COULEE
RESERVOIR
CHAIN
LAKES
PROVINCIAL
PARK
FIFTH MERIDIAN
STAVELY
PROPOSED
CANAL
Willow
Pulteney
CLARESHOLM
Woodhouse
GRANUM
ROCKY
MOUN.
OLDMAN
PROPOSED PINE COULEE PROJECT
ENVIRONMENTAL IMPACT
ASSESSMENT
Study Area
FIGURE 1

ALBERTA PUBLIC WORKS, SUPPLY AND SERVICES

PROPOSED PINE COULEE PROJECT

PROPOSED TERMS OF REFERENCE

FOR THE

ENVIRONMENTAL IMPACT ASSESSMENT

ALBERTA PUBLIC WORKS, SUPPLY AND SERVICES
PROPOSED PINE COULEE PROJECT
ENVIRONMENTAL IMPACT ASSESSMENT
PROPOSED TERMS OF REFERENCE

1.0 INTRODUCTION

1.1 Nature and Scope of the Environmental Impact Assessment

The purpose of this document is to advise the government and the public of the information to be presented by Alberta Public Works, Supply and Services (APWSS) for an Environmental Impact Assessment (EIA) of the proposed Pine Coulee Project. The EIA will identify and assess the significance of expected impacts as a result of construction and operation of the Pine Coulee Project and will summarize mitigative procedures that would be undertaken to alleviate or minimize adverse effects. The EIA will enable the public and government to understand the environmental consequences of this project prior to a final decision on whether or not it may proceed.

1.2 Public Participation

A public participation program will be undertaken to inform those who may be affected by the project of the proponent's intentions and to provide opportunities to express concerns and contribute to the preparation of the EIA. The proponent will publish notice that they have been required to prepare an EIA, to advise of opportunity for the public to get information on the project and to express any concerns they may have so they may be addressed in the EIA. The EIA will document the public consultation initiatives undertaken and address the concerns and suggestions made by the public.

2.0 PROJECT OVERVIEW

This section will contain information on the proponent and an overview of the development for which the EIA is prepared.

2.1 Proponent

The proponent for this project is APWSS.

2.2 Project Area

The project area for the proposed Pine Coulee Project is shown on the map contained in the Project Description (Figure 1).

2.3 Physical Setting

The regional setting for the proposed development and the area that is to be the subject of the EIA will be described and illustrated. The geographic location, topography, physiography, hydrology, any unique geological features, climate and infrastructure will be provided.

2.4 Site Description

Detailed contour maps, to appropriate scales, will be provided for the areas where structures would be built or existing structures modified. For those areas where construction activities would occur, the location of buildings and facilities, domestic water wells, road access, utilities, irrigation works and other infrastructure will be provided. The ownership status of the subject lands including those owned by the Crown, local municipalities, and patented lands will also be included.

2.5 Development Plan

The various components of the proposed project will be described. Each component will be discussed as to how it would be built, operated and maintained including a development schedule.

2.6 Impact Summary

The key construction and operational activities of the project that would have environmental implications will be described and a summary of the impacts for this project provided.

The summary will outline the particular component, the expected significance and proposed mitigation. Significance will account for the nature, extent and duration of the impact.

3.0 PROJECT DESCRIPTION

3.1 History

A history of the development of the project will be presented.

3.2 Project Need

The need for the project and the expected benefits to the environment, to municipalities, to the agricultural community, to recreationists and to the regional economy in general will be described.

3.3 Project Definition

The proposed project is a multi-purpose water management project having operational and structural components.

The operational component is associated with diversions from, and return flows to, Willow Creek and will be described.

The structural component is comprised of water supply and storage facilities and will be described.

3.4 Timing

The proposed timing of implementation of the project will be presented.

4.0 PINE COULEE PROJECT

4.1 Environmental Information

Alberta Public Works, Supply and Services (APWSS) will provide information on those environmental parameters to be affected by the proposed development. This information will include the identification of impacts and an assessment of their significance and the extent to which they may or may not be mitigated by planning, project design, construction and operational practice. The EIA will address impacts resulting from the construction and operation of this project and will present the significance of these impacts in terms of their extent, nature and duration.

APWSS will support conclusions reached with quantifiable information. If such information is not available, a discussion of any limitations to the information utilized will be provided.

4.1.1 Flow Regime and Groundwater

4.1.1.1 The existing flow regime of Willow Creek will be presented.

4.1.1.2 Predicted changes to flows within Willow Creek based upon diversions and reservoir releases will be presented. Changes to river bed degradation and bank erosion that could occur as a result of changed flow regimes from project implementation will be assessed.

4.1.1.3 Existing groundwater resources in the project area will be described.

4.1.1.4 Predicted changes to surface/groundwater relationships as a result of diversions from Willow Creek and reservoir creation will be identified.

4.1.2 Water Quality

4.1.2.1 Existing water quality conditions in Willow Creek will be presented. Temporal and spatial trends will be identified. Factors affecting water quality, including season and discharge, will be identified.

4.1.2.2 Predicted changes to water quality within Willow Creek as a result of diversions out of Willow Creek and reservoir releases back to Willow Creek will be presented. Key water quality parameters will include temperature, dissolved oxygen, pH, phosphorus, nitrates, heavy metals and pesticides. Predicted changes to water quality and resultant impacts upon municipal/domestic use, stockwatering, and other uses will be discussed.

4.1.2.3 Predictions of the water quality in the proposed Pine Coulee Reservoir, will be undertaken. Limitations of water quality upon recreational uses, fisheries, domestic/municipal use, irrigation and stockwatering will be identified.

4.1.3 Aquatic Plants

4.1.3.1 The composition and distribution of aquatic plant communities in Willow Creek will be described. Any rare or endangered species will be highlighted.

4.1.3.2 Predicted changes to these vegetative communities based upon diversions and reservoir releases will be identified.

4.1.4 Fish and Invertebrates

Widely varying flows in Willow Creek characterized by very low summer and winter flows, have resulted in limited fishery resources. The provision of an off-stream reservoir offers opportunity for improved fisheries in Willow Creek downstream of the reservoir as a result of stabilized flows.

4.1.4.1 Information on existing fish species composition, distribution, movement and abundance will be presented. Additional

emphasis will be placed upon rare or endangered species.

4.1.4.2 Fisheries habitat will be mapped and evaluated with special emphasis on critical habitats such as spawning, rearing and overwintering habitat.

4.1.4.3 Present limitations of physical habitat for fish populations will be identified.

4.1.4.4 The impact of project construction and project operation on the fisheries resource will be identified with respect to nature, extent and duration. Positive and negative impacts resulting from construction of the diversion weir, changed flow regimes, water quality, food availability and aquatic vegetation will be emphasized.

4.1.4.5 An assessment of the potential for fish populations to develop naturally, or to be successfully stocked in the Pine Coulee Reservoir will be undertaken.

4.1.4.6 The potential for mercury methylation in the newly created reservoir and its entering the aquatic food chain will be described with emphasis on predictions of the level of mercury levels in fish that might be expected to inhabit the reservoir.

4.1.4.7 The existing invertebrate populations of Willow Creek affected by project implementation will be described.

4.1.4.8 Predicted changes to the invertebrate community will be assessed based upon diversions and reservoir releases.

4.1.5 **Terrestrial Vegetation**

4.1.5.1 The existing vegetative communities in areas to be permanently disturbed by project construction and reservoir filling will be described. Rare and endangered species will be highlighted.

4.1.5.2 The composition and distribution of riparian communities along Willow Creek affected by project implementation will be described. Any rare or endangered species will be highlighted. Predicted changes to riparian communities based upon diversions and reservoir releases will be identified.

4.1.6 Soils

4.1.6.1 The general nature and distribution of soils in areas to be permanently disturbed by project construction and reservoir filling will be described.

4.1.6.2 Where identifiable, areas to be utilized for borrow materials and aggregate supplies will be identified.

4.1.6.3 Reservoir areas that may be susceptible to slope instability and wind erosion during drawdown will be identified.

4.1.6.4 Geotechnical conditions that may result in seepage from the reservoir will be assessed. Potential impacts as a result of reservoir seepage will be described.

4.1.6.5 The amount of mercury in soils to be flooded by reservoir filling will be identified.

4.1.7 Wildlife

4.1.7.1 The occurrences of mammals, birds, reptiles and amphibians within the project area will be described. Rare and endangered species will be highlighted.

4.1.7.2 Habitat availability will be delineated and rated as to its quality and significance. Key indicator species will be used to evaluate habitats.

4.1.7.3 Predicted effects on wildlife populations as a result of changes to habitat availability resulting from diversions from Willow Creek or permanent losses associated with reservoir flooding will be described and evaluated with respect to their regional significance.

4.1.8 Mitigation

4.1.8.1 For all predicted significant negative impacts upon natural resources, appropriate measures to avoid, eliminate or reduce these impacts during project construction and operation will be identified.

4.1.8.2 Mitigative strategies to ameliorate or achieve an equitable balance with negative impacts will be presented and evaluated.

4.1.8.3 A priority ranking of mitigative measures based upon significance of impacts, assessment of likelihood of success and cost-effectiveness will be presented. Non-mitigable impacts and their significance will be identified.

4.1.8.4 Further opportunities for environmental enhancement occurring as a result of project implementation and operation will be identified.

4.1.9 **Monitoring**

A monitoring program to evaluate the accuracy of predicted impacts, the effectiveness of mitigation measures implemented and the degree and duration of non-mitigable impacts will be presented. Scope, implementation schedules, costs and potential agency responsibility will be identified.

4.2 Historical and Archaeological Resources Information

An Historical Resources Impact Assessment (HRIA) of the project areas that will be physically disturbed or inundated by the project will be undertaken in accordance with the Historical Resources Act.

4.2.1 In consultation with the Historical Resources Division, Alberta Culture and Multiculturalism, a program to investigate the archaeological and palaeotological resources of the area will be undertaken. Historical resources relating to historic structures, remains of historic structures and relics associated with the settlement of the area will be inventoried.

4.2.2 A summary of the significant findings of the HRIA will be provided. Constraints on the proposed development in terms of protection and interpretation of the area's cultural resources will be identified.

4.2.3 A mitigation program to offset the impacts of the proposed project will be developed in cooperation with Alberta Culture and Multiculturalism. A summary of the mitigation program will be presented.

4.3 Public Consultation

4.3.1 The process of public consultation will be presented, including the methods of how information was disseminated to the public, the type of information and the level and nature of response.

4.3.2 The establishment of public advisory committees will be discussed identifying the representation, objectives and roles of each committee and the interrelationship between committees.

4.3.3 The process utilized to integrate public views in the scope and execution of the EIA will be presented as well as the public involvement in identification of mitigation strategies to alleviate or minimize adverse effects occurring as a result of project implementation.

5.0 SOCIO-ECONOMIC ASSESSMENT

This section of the EIA will assess the effects that the Pine Coulee Project could have on the population, infrastructure, recreational resources, land use and economy of the study area.

5.1 Construction and Operation

Implementation of the Pine Coulee Project would be expected to provide some employment and commercial opportunities for residents of the study area.

5.1.1 The annual expenditures that could occur during project construction, operations and maintenance will be described in terms of labour and non-labour (materials, equipment, etc.) components.

5.1.2 The expected annual employment requirements, by skill level and number of employees, for project construction and operation will be provided. The extent to which these employment requirements could be filled by residents of the study area will be estimated. The potential effect of project wages on the annual incomes of area residents employed on the project will be determined.

5.1.3 The extent to which material and equipment requirements could be purchased from businesses and suppliers in the study area and in the province will be estimated.

5.1.4 Any programs or initiatives that could be undertaken to maximize benefits to residents of the study area will be described.

5.1.5 The extent to which direct employment and labour income from project construction and operation could generate indirect and induced impacts

elsewhere in the provincial economy will be estimated.

5.2 Land Use and Infrastructure

Construction of the Pine Coulee Project is expected to have some impacts on land use, requiring the relocation of some infrastructure and, in some cases, relocation of land owners.

5.2.1 Existing private land uses that would be directly affected by the Pine Coulee Project will be identified. The nature of the land use, the area of land affected and the nature of the impact will be described. Opportunities for impact mitigation and compensation will be presented.

5.2.2 The procedure followed to achieve fair compensation to land owners for land required for the project and any associated damages will be presented.

5.2.3 All predicted impacts on public land uses, including transportation and other utilities will be identified. These will include the nature of the land use, the area of land affected and the nature of the impact. Opportunities for impact mitigation and compensation will be presented.

5.3 Recreation

Increased summer flows in Willow Creek and the creation of a new reservoir would affect both the quality and quantity of recreational activities in the study area.

5.3.1 The nature, extent and location of water-based recreational activities in the study area will be identified.

5.3.2 The characteristics of recreational resources before and after implementation of the project and diversion plan will be presented. The nature and cost of any development of recreational infrastructure being proposed as part of the project will be described.

5.3.3 The extent to which use of water-based recreational resources could change will be established. Impacts will be expressed in terms of both the nature and amount of activity that results.